In the Claims

Claims 1 - 14 (Cancelled)

15.   (Currently amended) A method of estimating precipitation characteristics comprising:

acquiring a radar image including at least a vertical plane of a precipitation zone;

processing via a computation unit a vertical profile of said precipitation zone to generate

digital signals representative of reflectivity in vertical direction z;

integrating via the computation unit the signals representative of reflectivity by assimilation

of a reflectivity vertical profile in an aggregation model to generate a signal representative of the

profile in the vertical plane of a mean particle diameter weighted by mass of each particle; and

determining via the computation unit and displaying on a display device connected to the

computation unit, concentration of the solid particles on the basis of signals representative of the

profile in a vertical plane of a mean particle diameter weighted by mass of each particle.

16.   (Currently amended) The method according to claim 15, wherein integrating

comprises determining variable Z(h) of the radar image observable in mm^6/m^3 as a function of

altitude h on the basis of the radar image, and determining the mean diameter Dm(h) of the particles

with the following equation:

$$\frac{\delta D_m}{\delta h} \equiv -0.25 k_{eff} a D_m^{b-5} 10^{-18} Z + \left(\frac{11\delta Z}{6Z\delta h}\right) D_m \qquad \underline{(2)}$$

$$[[\frac{fD_m}{fh} \equiv -0.25 k_{eff} a D_m^{b-5} 10^{-18} Z + \left(\frac{11 fZ}{6Z fh}\right) D_m \qquad \underline{(2)}]]$$

where:

Z is the radar image to be inverted in mm^6/m^{-3};

D_m is in meters (m);

a and b are coefficients specific to aggregate particles;

k_{eff} is the coefficient of effectiveness of aggregation to be adjusted.

17.   (Previously presented) The method according to claim 16, wherein the coefficient k_{eff} is equal to 0.3.

18.   (Previously presented) The method according to claim 16, wherein the coefficient a is equal to 35184.

19.   (Previously presented) The method according to claim 16, wherein the coefficient b is equal to 3.16.

20.   (Previously presented) The method according to claim 15, wherein the integration constant is determined so that the value $D_m(h)$ at the top of a cloud corresponds to the predetermined value for the total number of particles at the top of the cloud.

21.   (Previously presented) The method according to claim 15, wherein the profile of the total number of particles $n_t(h)$ is determined by the following equation:

$$n_T(h) = x.Z(h)/D_m(h)^6.$$

22.   (Previously presented) The method according to claim 15, wherein x is equal to 25.4 10^{-18}.

23.   (Previously presented) The method according to claim 15, wherein meteorological parameter $N_O(h)$ is determined by the following equation:

$$N_O(h) = y.Z(h)/D_m(h)^7.$$

24.   (Previously presented) The method according to claim 15, wherein y is equal to 102 10^{-18}.

25.   (Previously presented) The method according to claim 15, wherein the meteorological parameter corresponding to the profile of the ice water content $IWC(h)$ (in g/m^3) is determined by the following equation:

$$IWC(h) = wZ(h)/D_m(h)^3.$$

26.   (Previously presented) A method according to claim 25, wherein w is equal to 1.25 10^{-12}.

27.   (Previously presented) A profile determined according to claim 15, wherein the meteorological parameter corresponding to a profile of solid precipitation rate R(h) (mm/h equivalent melted) is determined by the following equation:

$$R(h) = r.Z(h)/D_m(h)^{2.35}.$$

28.   (Previously presented) The method according to claim 15, wherein characterized in that r is equal to 4.698 10^{-10}.

29.   (Currently amended) A method of estimating precipitation rate for solid precipitation comprising:

an acquisition step comprising acquiring a radar image including at least a vertical plane of a precipitation zone and processing via a computation unit a vertical profile of said precipitation zone to deliver digital signals representative of reflectivity in the vertical direction z;

an integration step comprising integrating via the computation unit signals representative of reflectivity by assimilation of the reflectivity vertical profile in an aggregation model to deliver a signal representative of the profile in the vertical plane of a mean particle diameter weighted by mass of each particle; and

a determination and displaying step comprising determining via the computation unit and displaying on a display device connected to the computation unit, concentration of the solid particles

on the basis of signals representative of the profile in a vertical plane of a mean particle diameter weighted by mass of each particle.

30. (Currently amended) The method according to claim 29, wherein the integration step comprises determining variable Z(h) of the radar image observable in mm^6/m^3 as a function of the altitude h on the basis of the radar image, and determining the mean diameter Dm(h) of the particles with the following equation:

$$\frac{\delta D_m}{\delta h} = -0.25 k_{eff} a D_m^{b-5} 10^{-18} Z + \left(\frac{11 \delta Z}{6 Z \delta h}\right) D_m \qquad \underline{(2)}$$

$$[[\frac{f D_m}{f h} = -0.25 k_{eff} a D_m^{b-5} 10^{-18} Z + \left(\frac{11 f Z}{6 Z f h}\right) D_m \qquad \underline{(2)]]}$$

where:

Z is the radar image to be inverted in mm^6/m^{-3};

D_m is in meters (m);

a and b are coefficients specific to aggregate particles;

k_{eff} is the coefficient of effectiveness of aggregation to be adjusted.

31. (Previously presented) The method according to claim 29, wherein the integration constant is determined so that the value D_m(h) at the top of a cloud corresponds to the predetermined value for the total number of particles at the top of the cloud.

32. (Previously presented) The method according to claim 29, wherein the profile of the total number of particles n_t(h) is determined by the following equation:

$$n_T(h) = x.Z(h)/D_m(h)^6.$$

33. (Previously presented) The method according to claim 29, wherein meteorological

parameter $N_O(h)$ is determined by the following equation:

$$N_O(h) = y.Z(h)/D_m(h)^7.$$

34.   (Previously presented) The method according to claim 29, wherein the meteorological parameter corresponding to a profile of ice water content *IWC(h)* (in g/m^3) is determined by the following equation:

$$IWC(h) = wZ(h)/D_m(h)^3.$$